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(54) Title of the Invention: A Bath Agent and a Method for its Manufacture

(57) [Abstract]

[Objective] To obtain a bath agent that has such effects as a warmth maintaining effect, a moisture maintaining effect and that leaves a clean feeling after bathing.

[Structure] It is a bath agent that is characterized in that it contains an aqueous extraction solution of soybeans and in that it contains an immersion solution of whole soybeans, skinned soybeans and defatted soybeans, a filtrate of soybean milk that has been subjected to ultrafiltration, soybean whey or a concentrated solution thereof.

[Effect] It has such effects as increasing the softness and smoothness of the skin after bathing, of increasing the warmth maintaining effect and of providing a gentle feel after bathing. It also has the effect of preventing a feeling of dryness and itching of the skin.

[Claims]

[Claim 1] A bath agent that contains an extraction solution of soybeans.

[Claim 2] A bath agent as described in Claim 1 in which the aqueous extraction solution contains of 0.1 to 50 g/100 ml, converted for glucose, of soluble sugar component of soybean.

[Claim 3] A bath agent as described in Claim 1 in which the aqueous extraction solution contains proteins, amino acids, oligosaccharides, saponins, isoflavones, vitamins, minerals and organic acids originating from soybeans.

[Claim 4] A bath agent as described in Claims 1, 2 or 3 in which the aqueous extraction solution is an aqueous immersion solution of whole soybean, skinned soybean and defatted soybean.

[Claim 5] A bath agent as described in Claims 1, 2 or 3 in which the aqueous extraction solution is a filtrate obtained by ultra filtration of soybean milk of which whole soybeans, skinned soybeans or defatted soybeans are the raw materials.

[Claim 6] A bath agent as described in Claims 1, 2 or 3 in which the aqueous extraction solution is whey obtained at the time of manufacture of separated soybean protein.

[Claim 7] A method for the manufacture of a bath agent characterized in that whole soybeans, skinned soybean or defatted soybeans are immersed for 5 minutes to 20 hours in water at 5 to 100°C, after which the soybeans are removed and in that it contains the immersion solution that is obtained or the concentrated immersion solution.

[Claim 8] A method for the manufacture of a bath agent characterized in that whole soybeans, skinned soybeans or defatted soybeans are immersed for 5 minutes to 20 hours in water at 5 to 100°C, after which the soybeans are removed and in that it contains the immersion solution that is obtained or the concentrated immersion solution.

[Claim 9] A method for the manufacture of a bath agent characterized in that it contains the whey that is produced when separated soybean protein is manufactured by standard methods or this whey which has been concentrated.

[Detailed Description of the Invention]

[0001]

[Field of industrial use] This invention relates to a bath agent in which an aqueous extraction of soybeans is compounded and to a method for its manufacture.

[0002]

[Prior art] Bath agents have been developed and used for the purposes of maintaining the warmth of the body obtained by bathing, of recovery from fatigue by promoting blood flow, of mitigating oversensitivity to cold, or moderating irritation of evening baths on the skin or of prolonging such effects on mood as the fragrance of the bath or the coloration of the skin.

[0003] Further, in the development of bath agents in recent years, in addition to the effect of maintaining warmth, development has proceeded in the direction of providing effects of a simple body care agent that creates a healthy state of the skin over the entire body and the use of many additives has been studied.

[0004] For example, diverse substances have been compounded, including products that provide a warmth maintaining effect by means of polyvalent alcohols such as glycerol, products in which proteolytic enzymes are compounded to increase the detergent effect, products in which oils are compounded to soften the skin and products in which fresh leaf extracts and vitamins are compounded. Bath agents such as these leave room for improvement in such aspects as safety, a warmth maintaining effect, moisture maintaining effect, and a clean feeling after coming out of the bath.

[0005] On the other hand, it has been confirmed that the glycosides of soybeans have various physiological actions and bath agents in which soybean extract phospholipids (Japanese Patent Application Early Disclosure No. 3-58919 [1991]) and humectants in which aqueous extracts of soybean hypocotyl (Japanese Patent Application Early Disclosure No. 63-243013 [1988]) are known.

[0006]

[Problems the invention is intended to solve] In all of these cases, attention has been drawn to specified components of soybeans and complicated processes are necessary in order to extract these components. The attention of the inventors was drawn to soybean immersion solutions that are produced as a by-product during the manufacture of *tofu* [bean curd] and studies were conducted for the purpose of their effective utilization. When this was done, it was unexpectedly confirmed that these immersion solutions themselves are effective as bath agents. It was also found that the filtrate that is produced as a by-product during ultrafiltration and concentration of soybean milk and the whey that is produced during the manufacture of separated soybean protein also have similar effectiveness. This invention was perfected on the basis of these findings. We shall now describe this invention more specifically.

[0007]

[Means for solving the problems] The aqueous extraction solutions of soybeans that are used in this invention are immersion solutions obtained by aqueous immersion of whole soybeans, skinned soybeans or defatted soybeans and "whey" that is produced as a by-product during manufacture of separated soybean protein or filtrates obtained when soybean milk is filtered with an ultrafiltration membrane. These components are components that are comprised of sucrose, raffinose, stachyose, saponin, isoflavone, proteins, amino acids, vitamins, minerals and organic acids originating from soy beans. An example of the components of the filtrate obtained when soybean milk is filtered with an ultrafiltration membrane is shown below.

[0008]

(1)	Oligosaccharides	1.23%
(2)	Proteins	0.35%
(3)	Amino acids	0.04%
(4)	Organic acids	0.30%
(5)	Isoflavones	0.08%
(6)	Saponins	0.01%
(7)	Lipids	less than 0.05%
(8)	Vitamins	0.03%
(9)	Minerals	0.27%

[0009] The various components described above can be found by the following analytical methods.

(1) High pressure liquid chromatography (sucrose, stachyose, raffinose)

(2) Total nitrogen content by the Kjeldahl method × 6.25

(3) Amino acid automated analysis method and high pressure liquid chromatography (arginine, lysine, histidine, phenylalanine, tyrosine, isoleucine, methionyl, amine, alanine, glycine, proline, glutamic acid, serine, threonine, aspartic acid, tryptophan, cysteine)

(4) High pressure liquid chromatography (citric acid, malic acid, acetic acid)

(5) High pressure liquid chromatography (daidzin, genistin, daidzein, genistein) (6) High pressure liquid chromatography (group A and group B saponins)

(7) Soxhlet extraction method

(8) High pressure liquid chromatography and microorganism quantitative determination methods (B_1, B_2, B_6, H, niacin, panthothenic acid, inositol)

(9) Bernard molybdenic acid absorbance method, o-phenanthophosphorus absorbance method, atomic absorption method (P, Fe, Ca, Na, K, Mg, Zn)

When the soluble sugar components of this filtrate were determined by the phenolsulfuric acid method, the value converted for glucose was 2.05%.

[0010] Thus, the aqueous extraction solution of soybeans that is used in this invention is a solution that contains the various constituents in soybeans in a comprehensive way and the bath agent of this invention is characterized in that not only are specified components among these components used but that the extraction solution is used just as is.

[0011] These aqueous extraction solutions are prepared to a soluble sugar content of 1 to 20% and products can be made in which they are used in unaltered form or various substrates, fragrances and coloring agents are compounded with them. These aqueous extract solutions contain essentially no oleaginous components. Therefore, there is extremely little generation of unpleasant odors due to oxidation of oleaginous components and the products have excellent storage stability.

[0012] The soluble sugar components that are spoken of here are water-soluble saccharides (sucrose, raffinose, stachyose, saponins, and isoflavone glycosides) that are eluted by aqueous immersion and pulverization. They are found by the phenolsulfuric acid method (Biochemical Test Methods, A. General Methods [A-1 Reduced Sugars Quantitative Determination Method], University of Tokyo Press, published 15 February 1971) and are expressed as glucose conversion values.

[0013] Specifically, the test material (immersion water, filtrate obtained when soybean milk is filtered by an ultrafiltration membrane or soybean whey) is directly quantitatively determined by the phenolsulfuric acid method or the pH of the test material is adjusted to 4.5 with hydrochloric acid, the protein is precipitated, centrifugation is performed, the sugar concentration in the supernatant is determined quantitatively by the phenolsulfuric acid method and is found as the glucose value.

[0014] Below, we shall present specific descriptions of the methods of preparation of the aqueous extract solutions from the various raw materials and of the methods of manufacture of the bath agents. For example, when immersion solutions of skinned soybeans are used as the raw materials, whole soybeans are heated with hot air at 70 to 300°C and then pressed with a roller. When this is done, they are separated into cotyledon, hypocotyl and skin. The cotyledon part is collected and the skinned soybean is obtained. It is then immersed for 5 minutes to 20 hours in water of 3 to 20 times the weight of the soybeans.

[0015] The immersion temperature is 5 to 100°C. When the immersion temperature is increased, immersion time can be shortened. What is essential is that immersion is performed under conditions in which the water soluble saccharides in the soybeans can be sufficiently extracted. When immersed soybeans are used as raw materials for *tofu* [bean curd] and or soybean milk beverages, it is also necessary to consider extraction of proteins. Desirable conditions are 8 to 20 hours at 20 to 30°C, 1 to 6 hours at 40 to 55°C and 5 to 30 minutes at 70 to 90°C. By this means, the soluble sugar constituents in the immersion water amount to 0.1 to 5%.

[0016] After immersion, the materials are separated into soybeans and the immersion solution is used as the raw material. When whole soybeans are used as the raw materials, the conditions are the same except that immersion time is lengthened. When protein is eluted into this immersion solution and a product is made, it becomes a cause or turbidity and it is advisable to remove it. Methods that can be used for removal of protein include lowering the pH of the immersion solution to the isoelectric point of the protein and the

precipitate is removed. In addition, a method based on addition of acid is employed. However, a method in which the pH is lowered by lactic acid fermentation is preferable. The reason for this is that soybean odor can be mitigated by lactic acid fermentation.

[0017] For example, commercially sold lactic acid bacteria, such as Streptococcus thermophilus and Lactobacillus bulgaricus are added to the immersion solution and lactic acid fermentation is effected for 2 to 20 hours at 20 to 45°C. When the pH reaches 5.0 to 5.5, the solution can be centrifuged and the precipitate removed to obtain a clear solution. This clear solution can be used as a bath agent in unaltered form. However, good effects are not obtained when the concentration of soluble sugar constituents is low and when it is not added in large quantities to the bath. Therefore, it is desirable to concentrate it. For example, it can be concentrated at 45 to 65°C under reduced pressure of 600 to 700 mmHg. For the purpose of preservation and preventing growth of mold in the concentrated solution, on the order of 0.2% sodium benzoate can be added to fill the container and to make the bath agent product.

[0018] When an immersion solution of defatted soybeans is used, the defatted soybeans are immersed for 2 to 3 hours at 20 to 30°C and 0.5 to 1 hour at 40 to 55°C. In this case, in order to inhibit elution of protein as much as possible, it is desirable during immersion to carry out immersion with the pH of the immersion solution adjusted to 4 to 5 with an organic acid or an inorganic acid. Following that, the same treatment is performed as for skinned soybeans and an extraction solution is obtained.

[0019] When a filtrate of soybean milk obtained by ultrafiltration and concentration is used as the raw material, the soybean milk, which is obtained by the same methods as when *tofu* [bean curd] and soybean milk beverages are manufactured using whole soybeans and skinned soybeans as the raw materials, is concentrated with an ultrafiltration membrane of a fractionation molecular weight of 30,000 to 300,000, the filtrate that is produced is collected and is made into a bath agent in unaltered form or by concentration. At this time, the filtrate is subjected to lactic acid fermentation and may be made acidic to on the order of pH 5.0.

[0020] When the whey that is produced as a by-product during manufacture of separated soybean protein is used as the raw material, for example, 15 times its volume of water is added to defatted soybeans, the pH is adjusted to 7.5 with sodium hydroxide and the materials are stirred for 2 hours at room temperature, after which the solid matter and the solution are separated, the insoluble matter (bean curd lees) is removed and a solution containing protein is obtained. Its pH is adjusted to 4.5 with hydrochloric acid and the protein is precipitated, after which solid-solution separation is effected into protein fraction (separated soybean protein) and whey. The whey may be used in unaltered form or concentrated to make the bath agent.

[0021] Fragrances and pigments as well as inorganic salts, inorganic acids, raw drugs, vitamins, amino acids and enzymes that are ordinarily used in bath agents can be mixed as desired with the bath agents of this invention. In the use of these bath agents, they should be added so that the soluble sugar component comes to 0.1 to 5.0 g, and, preferably, 1.0 to 2.5 g, per 100 L of bath.

[0022] The bath agent that is obtained in this way has the effects of increasing the moistness and smoothness of the skin and of maintaining warmth and also of providing an invigorating feeling after coming out of the bath. It also has the effect of stopping feelings of dryness and itching of the skin. Moreover, it has the further effect of preventing the occurrence of dandruff by rinsing with hot water to which this bath agent has been added after washing the hair.

[0023] The aqueous extraction solution of this invention can be suitably concentrated, used in unaltered form or mixed with an ointment base material or it can be used as a topical skin agent. Examples are presented below.

[0024]

[Example 1]

Example 1

Whole soybeans were heated with hot air at 75°C, after which they were pressed with a roller, skinned, the skin and hypocotyl were removed and two lots of soybeans were obtained. The skinned

soybeans were immersed in a hot bath of 55°C the pH of which had been adjusted to 9 with an alkali, after which the immersion solution was separated. The soluble sugar component of this immersion solution was 0.99 g/100 ml. This immersion solution was sterilized by heating for 30 seconds at 145°C. It was then cooled to 40°C, lactic acid bacteria (Streptococcus thermophilus and Lactobacillus bulgaricus) were added and lactic acid fermentation was performed at 40°C to pH 5.0.

[0025] After the lactic acid fermentation, centrifugation (3,000 rpm) was performed and the supernatant that was obtained was concentrated at a reduced pressure of 650 mmHg and at 60°C to one-fourth it volume. Sodium benzoate was added to give 0.2%, after which it was filtered to make it clear. It was then filled into a container to make the bath agent product. The soluble sugar content in this product was 4.36 g/100 ml.

[0026] Example of Use

The bath agent described above was used for 7 days by men and women of ages 10 to 70 and they were interviewed about their impressions of it after bathing. The method by which it was used was to add on the order of 30 ml per approximately 100 L of bath water so that the soluble sugar content in the bath was 8 to 12 ppm. The results are shown in Table 1.

[0027] Table 1

Male in his teens: There was no more itching due to my atopic skin roughness after bathing.

Female in her twenties: I've had itching because of dry skin and have used commercial drugs. It was relieved.

Female in her twenties: There was no more itching after coming out of the bath. My skin had a smooth feeling.

Female in her thirties: The bath had a moist feel. My skin felt smooth.

Female in her thirties: My skin felt smooth. It had a warm feeling.

Male in his thirties: My skin felt smooth. It had a warm feeling.

Female in her forties: The water had a clean feel to it. My skin felt clean.

Female in her forties: My body was warm and I slept well.

Female in her fifties: The water was soft around me. My face was smooth. There was a luster to my hair.

Male in his fifties: I felt invigorated when I came out of the bath. My skin was moist. It was nice and warm.

Female in her sixties: There was no more itching after I came out of the bath.

Female in her seventies: There was no more itching after I came out of the bath.

[0028] Example 2

Whole soybeans were heated by hot air at 75°C, after which they were pressed with a roller, skinned, the skin and hypocotyl were removed and two lots of soybeans obtained. The skinned soybeans were ground while cold water (5°C) in the amount of 10 times their volume was being added with a paste being formed. This paste was heated for 30 seconds at 100°C, after which it was cooled to 80°C, solid-solution separation was performed with a screw decanter and soybean milk was obtained. The soybean milk that was obtained was deaerated, after which it was sterilized by heating for 3 minutes at 120°C and the protein concentration was adjusted to 5.0%. Following that, it was filtered with an ultrafiltration membrane of a fractionation molecular weight of 300,000 and the low molecular weight portion was recovered as the filtrate. The soluble

sugar content of this filtrate was 2.05 g/100 ml. It was then concentrated under reduced pressure to giver a soluble sugar content of 20.0 g/100 ml, a fragrance (citron essence) and a coloring agent (Yellow No. 202) were added, sodium benzoate was added to give 0.3% and the bath agent product was obtained. It was confirmed that this bath agent had the same effects as the bath agent of Example 1.

[0029] Example 3

Defatted soybean flakes were immersed for 1 hour at room temperature in 15 times their volume of water as the pH was being adjusted to 5.0 with lactic acid. After immersion, they were filtered and the filtrate was sterilized by heating for 1 minute at 140°C. The soluble sugar content of this filtrate was 0.98 g/100 ml. It was then concentrated under reduced pressure to one-fourth its volume and the concentrated solution was filtered and made clear, after which sodium benzoate was added to give 0.1%, it was filled into a container and the bath agent product was made. The soluble sugar content of this product was 3.90 g/100 ml.

[0030] Example 4

Whole soybeans were heated at 75°C by hot air, after which they were skinned and compressed. They were then defatted with hexane. Water in the amount of 15 times their volumes the pH of which had been adjusted to 7.5 with sodium hydroxide was added to these defatted soybeans and the were stirred for 2 hours at room temperature, after which solid-liquid separation was performed and the insoluble matter was removed. The solution containing protein that was obtained was adjusted to pH 4.5 with hydrochloric acid, the protein was precipitated and solid-liquid separation was again performed. Next, the protein portion was removed, sodium benzoate was added to the remaining solution to give 0.3% and a container was filled with it to make the bath agent product. The soluble sugar content of this product was 0.93 g/100 ml.

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(54)【発明の名称】　入浴剤及びその製造法

(57)【要約】

【目的】　保温効果、保温効果、湯上がり後のさっぱり感等に効果のある入浴剤を得る。

【構成】　大豆の水抽出液を含有させた入浴剤であって、丸大豆、脱皮大豆、脱脂大豆の浸漬液、豆乳の限外濾過時の濾液あるいは大豆ホエーあるいはこれらの濃縮液を含有させることを特徴とする。

【効果】入浴後肌がしっとりとし滑らかさが増し、また保温効果が増し、更に湯上がり感がさわやかである等の効果を有する。また皮膚のカサカサ感や痒みの防止効果も有する。

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【特許請求の範囲】

【請求項1】　大豆の水抽出液を含有する入浴剤

【請求項2】　水抽出液が、大豆の可溶性糖分をグルコース換算値として0．1～50g／100ml含有する請求項1記載の入浴剤

【請求項3】　水抽出液が、大豆由来の蛋白質、アミノ酸、オリゴ糖、サポニン、イソフラボン、ビタミン、ミネラル、有機酸を含有する請求項1記載の入浴剤

【請求項4】　水抽出液が、丸大豆、脱皮大豆又は脱脂大豆の水浸漬液である請求項1、2又は3記載の入浴剤

【請求項5】　水抽出液が、丸大豆、脱皮大豆又は脱脂大豆を原料とする豆乳を限外濾過膜で濾過した濾液である請求項1、2又は3記載の入浴剤

【請求項6】　水抽出液が、分離大豆蛋白製造時のホエーである請求項1、2又は3記載の入浴剤

【請求項7】　丸大豆、脱皮大豆又は脱脂大豆を5～100℃の水に5分～20時間浸漬後大豆を除去し、得られた浸漬液又はこれを濃縮した浸漬液を含有させることを特徴とする入浴剤の製造法

【請求項8】　丸大豆、脱皮大豆又は脱脂大豆を水と共に磨砕し、磨砕物を加熱後濾過し、得られた豆乳を限外濾過膜で濾過した濾液又はこの濾液を濃縮した濾液を含有させることを特徴とする入浴剤の製造法

【請求項9】　常法により分離大豆蛋白を製造する際に生ずるホエー又はこのホエーを濃縮したホエーをを含有させることを特徴とする入浴剤の製造法

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は大豆の水抽出液を配合した入浴剤及びその製造法に関する。

【0002】

【従来の技術】入浴剤は入浴によって温められた身体の保温、血行促進による疲労の回復、冷え症の緩解、更湯の皮膚に対する刺激の緩和或いは浴湯に香りや色付けしての気分転換等の効果を助長する目的で開発、使用されている。

【0003】さらに近年の入浴剤の開発は、保湿効果等の効果に加え、全身の皮膚状態を健全ならしめる手軽なボディケア剤としての効果を付与する方向に展開されており、多くの添加剤の利用が検討されている。

【0004】例えばグリセリンなどの多価アルコール類により保湿効果を付与したもの、蛋白質分解酵素を配合し洗浄効果を高めたもの、油分を配合して皮膚を柔軟にするもの、生薬エキスやビタミン類を配合したもの等多岐にわたっている。上記したような入浴剤は、保湿効果、保温効果、湯上がり後のさっぱり感、あるいは安全性において改良の余地がある。

【0005】一方大豆の配糖体は種々の生理作用のあることが確認されており、また大豆抽出リン脂質を配合した入浴剤（特開平3-58919）、大豆胚軸の水抽出物を有効成分とする保湿剤（特開昭63-243013）等が知られている。

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【0006】

【発明が解決しようとする課題】これらはいずれも大豆中の特定成分に着目したもので、その成分を分取するための複雑な工程を要するものである。本発明者等は豆腐製造時に副生する大豆浸漬液に着目し、これの有効利用を目的として検討をすすめたところ、意外にもこの浸漬液そのものが入浴剤として効果のあることを確認した。また豆乳の限外濾過濃縮時に副生する濾液や、分離大豆蛋白を製造する際に生ずるホエーも同様の効果を有するとの知見を得た。本発明はこれらの知見により完成したものであり、以下に本発明を具体的に説明する。

【0007】

【課題を解決するための手段】本発明に用いられる大豆の水抽出液とは、丸大豆、脱皮大豆あるいは脱脂大豆を水浸漬して得られる浸漬液、分離大豆蛋白製造時に副生する”ホエー”、あるいは豆乳を限外濾過膜で濾過したときの濾液であり、これらの成分は大豆由来のシュークロース、ラフィノース、スタキオース、サポニン、イソフラボン、蛋白質、アミノ酸、ビタミン、ミネラル、有機酸等から成るものであり、例えば豆乳を限外濾過膜で濾過したときの濾液の成分の一例を示すと以下の通りである。

【0008】(1)オリゴ糖　　1．23％
(2)蛋白質　　0．35％
(3)アミノ酸　　0．04％
(4)有機酸　　0．30％
(5)イソフラボン　　0．08％
(6)サポニン　　0．01％
(7)脂質　　0．05％以下
(8)ビタミン　　0．03％
(9)ミネラル　　0．27％

【0009】なお上記各成分は以下の分析法によって求めたものである。

(1)高速液体クロマトグラフ法（シュークロース、スタキオース、ラフィノース等）

(2)ケルダール法による総窒素量×6．25

(3)アミノ酸自動分析法及び高速液体クロマトグラフ法（アルギニン、リジン、ヒスチジン、フェニールアラニン、チロシン、ロイシン、イソロイシン、メチオニン、アミン、アラニン、グリシン、プロリン、グルタミン酸、セリン、スレオニン、アスパラギン酸、トリプトファン、シスチン等）

(4)高速液体クロマトグラフ法（クエン酸、リンゴ酸、酢酸）

(5)高速液体クロマトグラフ法（ダイジン、ゲニスチン、ダイゼイン、ゲニステイン等）(6)高速液体クロマトグラフ法（サポニンAグループ、Bグループ等）

(7)ソックスレー抽出法

(8)高速液体クロマトグラフ法及び微生物定量法（B_1、B_2、B_6、H、ナイアシン、パントテン酸、イノシトール等）
(9)バナドモリブデン酸吸光光度法、o－フェナントロリン吸光光度法、原子吸光光度法（P，Fe，Ca，Na，K，Mg，Zn等）
なおこの濾液の可溶性糖分をフェノール－硫酸法で測定したところグルコース換算値として2．05％であった。

【0010】このように本発明で用いられる大豆の水抽出液は大豆中の種々の成分を総合的に含有するものであり、本発明の入浴剤はこれらの成分中の特定成分のみを使用するものでなく、抽出液をそっくりそのまま使用するところに特徴がある。

【0011】そしてこれら水抽出液は、可溶性糖分が1～20％になるように調製し、これをそのままあるいは各種基剤、香料、着色料を配合して製品とする。なおこれら水抽出液には油性成分は殆ど含有しないので、油性成分の酸化による異臭の発生等が極めて少なく、製品の保存安定性に優れるものである。

【0012】なおここでいう可溶性糖分は水浸漬や磨砕等によって溶出する水溶性糖類（シュークロース、ラフィノース、スタキオース、サポニン、イソフラボン配糖体）であって、フェノール－硫酸法（生物化学実験法、A．一般分析法、［A－1還元糖の定量法］、東京大学出版会、1971年2月15日発行）で求めグルコース換算値として表したものである。

【0013】すなわち試料（浸漬水、豆乳を限外濾過膜で濾過したときの濾液あるいは大豆ホエー等）を直接フェノール－硫酸法で定量するか、あるいは試料を塩酸でpH4.5に調整し、蛋白を沈殿させ、遠心分離して上澄液の糖濃度をフェノール－硫酸法で定量しグルコース量として求める。

【0014】以下に各原料からの水抽出液の調製方法、入浴剤の製造方法について具体的に説明する。例えば脱皮大豆の浸漬液を原料とする場合は、丸大豆を70～300℃の熱風で加熱し、ローラーで押圧すると子葉、胚軸、皮に分離されるので、子葉部を採取し脱皮大豆とする。これを大豆重量の3～20倍量の水に5分～20時間浸漬する。

【0015】浸漬の温度は5～100℃であり、浸漬温度が高ければ浸漬時間を短くすることができる。要は大豆中の水溶性糖類を十分に抽出できる条件で浸漬すればよいが、浸漬大豆を豆腐や豆乳飲料等の原料として使用する場合には、蛋白質の溶出も考慮する必要があり、好ましい条件としては20～30℃で8～20時間、40～55℃で1～6時間であり、70～90℃で5～30分である。こうすることにより浸漬水中の可溶性糖分は0．1～5％となる。

【0016】浸漬後、大豆と浸漬液に分離し、この浸漬液を原料とする。なお丸大豆を原料とする場合には、浸漬時間を長くする以外は脱皮大豆と同様である。この浸漬液には蛋白質が溶出しており、製品にした場合、混濁の原因になるので予めこれを除去しておくことが好ましい。蛋白質の除去は浸漬水のpHを蛋白質の等電点まで低下させて沈殿除去する方法が採用でき、酸添加による方法でもよいが、乳酸発酵によってpHを低下させる方法が好ましい。なぜならば乳酸発酵によって大豆臭を緩和することができるからである。

【0017】例えば浸漬水に市販の乳酸菌ストレプトコッカス・サーモフィルス、ラクトバチルス・ブルガリカス等を添加し、20～45℃、2～20時間乳酸発酵させpH5．0～5．5になったならばこれを遠心分離して沈殿物を除去、清澄液とする。この清澄液はこのままでも入浴剤として使用できるが、可溶性糖分の濃度が低いと浴湯に大量に添加しなければ効果が得られないので、適宜濃縮することが好ましく、例えば45～65℃、600～700mmHgで減圧濃縮する。濃縮液は防腐、防黴の目的で例えば安息香酸ソーダを0．2％程度添加し容器に充填し、入浴剤製品とする。

【0018】また脱脂大豆の浸漬液を原料とする場合には、脱脂大豆を20～30℃で2～3時間、40～55℃で0．5～1時間浸漬する。この場合蛋白質の溶出を出来るかぎり抑制するために、浸漬時の浸漬水のpHを有機酸あるいは無機酸で4～5に調整して浸漬することが好ましい。以後脱皮大豆の場合と同様に処理して抽出液を得る。

【0019】また豆乳の限外濾過濃縮の濾液を原料とする場合には、丸大豆、脱皮大豆を原料として豆腐や豆乳飲料を製造する場合と同様の方法で得られる豆乳を、分画分子量3～30万の限外濾過膜で濃縮しその際生ずる濾液を集め、これをそのままあるいは濃縮して入浴剤とする。この際濾液を乳酸発酵を行い、pH5．0程度の酸性としてもよい。

【0020】また分離大豆蛋白製造時に副生するホエーを原料とする場合には、例えば脱脂大豆に15倍量の水を加え、カセイソーダでpH7.5に調整して室温で2時間攪拌後、固液分離して不溶物（おから）を除去し、蛋白質含有溶液を得る。これを塩酸でpH4.5に調整し、蛋白質を沈殿させた後、蛋白質区分（分離大豆蛋白）とホエーに固液分離し、このホエーをそのままあるいは濃縮して入浴剤とする。

【0021】本発明の入浴剤は、通常の入浴剤に使用されている香料、色素をはじめ無機塩、無機酸、生薬、ビタミン類、アミノ酸類、酵素類等を任意に混合することができる。また本入浴剤の使用にあたっては、浴湯100L当たり可溶性糖分が0．1～5．0g、好ましくは1．0～2．5gになる様に添加すればよい。

【0022】このようにして得られた入浴剤は、入浴後肌がしっとりとし滑らかさが増し、また保温効果が増

し、更に湯上がり感がさわやかである等の効果を有する。また皮膚のカサカサ感や痒みの防止効果も有する。さらに洗髪後、本入浴剤を添加したお湯ですすぐことにより、フケの発生を防止する効果も有する。

【００２３】尚本発明における水抽出液は適宜濃縮し、そのままあるいは軟膏基剤と混合し、皮膚外用剤として利用することができる。以下に実施例を示す。

【００２４】

【実施例】

実施例１

丸大豆を７５℃の熱風で加熱後ローラーで押圧、脱皮し、皮と胚軸を除去して二つ割の脱皮大豆を得た。この脱皮大豆をアルカリでpH9に調整した５５℃の温湯に２時間浸漬後、浸漬液を分離した。この浸漬液の可溶性糖分は0.99g/100mlであった．この浸漬液を１４５℃、３０秒間の加熱殺菌をし、４０℃に冷却、乳酸菌（ストレプトコッカス・サーモフィルス，ラクトバチルス・ブルガリカス）を添加、４０℃でpH5.0になるまで乳酸発酵させた。

【００２５】乳酸発酵後遠心分離（3,000r.p.m.）して得た上澄液を650mmHg、６０℃で１／４量まで減圧濃縮した。これに安息香酸ソーダを0.2%となるように加えた後、濾過して清澄化し、容器に充填して入浴剤製品とした。この製品中の可溶性糖分は4.36g/100mlであった。

【００２６】使用例

上記入浴剤を、１０～７０才の男女に７日間使用させ、入浴後の感想を聞き取り調査した。なお使用方法は、浴湯中の可溶性糖分が8～12ppmになるように、浴湯約100L当たり30ml程度添加して使用させた。結果を表１に示す。

【００２７】表１

１０代　男性　アトピー性の肌荒れによる湯上がり後の痒みがなくなった。

２０代　女性　カサカサ肌で痒みがあり市販の薬を使っていたが、解消した。

２０代　女性　湯上がり後の痒みがなくなった。肌が滑らかになった感じがする。

３０代　女性　お湯がしっとりとした感じ。肌がスベスベした。

３０代　女性　肌がスベスベする。温まる感じがする。

３０代　男性　肌がスベスベする。温まる感じがする。

４０代　女性　水がきれいになった様な感じがし、肌がさらっとした様な感じがする。

４０代　女性　体が温まってよく眠れる。

５０代　女性　お湯あたりが柔らかい。顔がツルツルする。髪につやがでる。

５０代　男性　湯上がりがさわやか。肌がしっとりする。よく温まる。

６０代　女性　湯上がり後の痒みがなくなった。

７０代　女性　湯上がり後の痒みがなくなった。

【００２８】実施例２

丸大豆を７５℃の熱風で加熱後ローラーで押圧、脱皮し、皮と胚軸を除去して二つ割の脱皮大豆を得た。この脱皮大豆を１０倍量の冷水（５℃）を加えながら磨砕して呉となし、この呉を１００℃、３０秒の加熱をした後８０℃まで冷却、スクリューデカンターで固液分離して豆乳を得た。得られた豆乳を脱気後、１２０℃、3分間の加熱殺菌を行い、蛋白濃度５．０%に調整後、分画分子量３０万の限外濾過膜で濾過し、低分子区分を濾液として回収した。この濾液の可溶性糖分は2.05g/100mlであった。これを可溶性糖分が20.0g/100mlになるよう減圧濃縮し、これに香料（柚エッセンス）、着色剤（黄色２０２号）を添加し、更に安息香酸ソーダを０．３%となるように添加し入浴剤製品を得た。この入浴剤も、実施例１の入浴剤と同様の効果が確認された。

【００２９】実施例３

脱脂大豆フレークを乳酸でpH5.0に調整しながら１５倍量の水に室温で１時間浸漬した。浸漬後濾過して、濾液を１４０℃、１分間の加熱殺菌した。この濾液の可溶性糖分は0.98g/100mlであった。これを１／４量まで減圧濃縮し、濃縮液を濾過清澄化したのち安息香酸ソーダを０．１%となるように加え、容器に充填して入浴剤製品とした。この製品の可溶性糖分は3.90g/100mlであった。

【００３０】実施例４

丸大豆を熱風で７５℃に加熱後脱皮し、圧偏した。これをヘキサンで脱脂し、この脱脂大豆にカセイソーダでpH7.5に調整した１５倍量の水を加え室温で２時間撹拌後、固液分離を行い不溶物を除去した。得られた蛋白質含有溶液を塩酸でpH4.5に調整し、蛋白質を沈澱させ、再度固液分離を行った。次いで蛋白質区分を取り除いた残りの溶液に安息香酸ソーダを０．３%となるように加え、容器に充填して入浴剤製品とした。この製品の可溶性糖分は0.93g/100mlであった。